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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/877,249	06/11/2001	Stanley John Becker	608-297	7974

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EXAMINER

LEUNG, JENNIFER A

ART UNIT	PAPER NUMBER
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1764

DATE MAILED: 08/29/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/877,249

Applicant(s)

BECKER ET AL.

Examiner

Jennifer A. Leung

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 02 August 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,2,5,6,10-16,18-20,47,48,51,52,54-60 and 62-64 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,2,5,6,10-16,18-20,47,48,51,52,54-60 and 62-64 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Response to Amendment

1. Applicant's request for reconsideration of the finality of the rejection of the last Office action is persuasive and, therefore, the finality of that action is withdrawn..

2. Applicant's amendment submitted on August 2, 2005 has been received and carefully considered. Claims 3, 4, 7-9, 17, 21-46, 49, 50, 53, 61 and 65 are cancelled. Claims 1, 2, 5, 6, 10-16, 18-20, 47, 48, 51, 52, 54-60 and 62-64 remain active.

Claim Objections

3. Claim 47 is objected to because "said inert fluid gas" (line 8) should be changed to --said inert gas--. Appropriate correction is required.

Claim Rejections - 35 USC § 103

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

4. Claims 1, 2, 5, 6, 10, 11, 19, 20, 47, 48, 51, 52, 54, 55, 63 and 64 are rejected under 35 U.S.C. 103(a) as being unpatentable over Collin et al. (US 4,374,663) in view of Suess (US 2,794,681) and Chowdhury (US 4,461,743).

Regarding claims 1 and 47, Collin et al. discloses a reactor (FIG. 3; column 3, lines 36-60) comprising more than one nozzle 46 extending into the reactor. Additionally, Collin et al. discloses that each nozzle 46 may be constructed according to the types disclosed in FIG. 1 or FIG. 2 (column 2, line 58 - column 3, line 35), wherein each nozzle 46 comprises an inlet pipe for an oxygen-containing gas (i.e., supply pipe 4) and a surround means for surrounding a substantial portion of the inlet pipe with a sealed, inert fluid (i.e., jacket 7, containing a cooling

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medium 5, such as water). In addition, Collin et al. discloses a fluidization means in the form of nozzles 50 opening out in the bottom of the lower reaction chamber 43 of the reactor. Collin et al., however, is silent as to whether the fluidization means may instead comprise a grid. In any event, it would have been obvious for one of ordinary skill in the art at the time the invention was made to substitute other known fluidization means, such as a grid, for the fluidization means in the apparatus of Collin et al., on the basis of suitability for the intended use, because the Examiner takes Official Notice that the use of grids for providing adequate fluidization of a mass of solids is well known in the art, and it has been held that the substitution of known equivalent structures merely involves ordinary skill in the art.

Collin et al. is further silent as to surround means 7 including a means for detecting a change in pressure of the inert fluid 5 that surrounds the inlet pipe 4, wherein the inert fluid 5 is present in a limited supply sufficient to replace minor leaks.

Suess (embodiment of FIG. 5; column 3, line 59 to column 4, line 32) teaches an inlet pipe (i.e., nozzle 3) suitable for feeding gaseous substances to a reactor (column 5, lines 4-14), wherein the inlet pipe 3 comprises a surround means (i.e., jacket 3') surrounding a substantial portion of the inlet pipe 3 and provided with a sealed supply of a cooling medium (i.e., from a cooling medium source 5, usually a liquid medium such as water; column 1, lines 38-55). In addition, Suess teaches means for detecting a change in pressure of the cooling medium 5 surrounding the inlet pipe 3 (i.e., by elements 10a, 10b, 10'' and 10''', which actuate according to a pressure difference, thereby initiating contact 11 to close the electric circuit and control a servomotor 9'''), wherein the surround means 3' is provided with a limited supply of cooling medium 5 sufficient to replace leaks (i.e., "by the contact 11 controlling servomotor 9''' the

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amount of the cooling medium is increased at the moment in which the amount discharged decreases because of a leakage... In this manner the detrimental effect of a leakage on the cooling procedure may be compensated to a certain extent,” column 4, lines 21-33).

It would have been obvious for one of ordinary skill in the art at the time the invention was made to provide a means for detecting a change in pressure of the inert fluid of the surround means in the apparatus of Collin et al., on the basis of suitability for the intended use and absent showing any unexpected results thereof, because the provision of such means would help avoid process disturbances due to leakage or similar defects occurring in the nozzles and parts or elements connected therewith, as taught by Suess (column 1, lines 17-33).

The collective teaching of Collin et al. and Suess is silent as to whether the supply of cooling medium 5, such as water, may instead comprise a supply of inert gas. In any event, it would have been obvious for one of ordinary skill in the art at the time the invention was made to substitute a supply of inert gas for the supply of cooling medium 5 in the modified apparatus of Collin et al., on the basis of suitability for the intended use, because the use of inert gas for cooling nozzle structures is well known in the art, and the substitution of known equivalents merely involves routine skill in the art. Chowdhury (FIG. 4; column 4, lines 14-40) evidences conventionality by teaching an apparatus comprising an inlet pipe (i.e., oxygen pipe 20) including a surround means for surrounding a substantial portion of said pipe with a supply of sealed, inert fluid (i.e., second pipe 21, for defining a sealed, annular space 22 with an inlet 24 for a supply of inert fluid). In particular, Chowdhury teaches that suitable supplies of inert fluid include, “a gas such as air, nitrogen or carbon dioxide... injected into annular space 22,” or, in another form, “a fluid, *either gas or liquid*, is passed through the annular space... Heat is thus

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removed from oxygen pipe 20 by the heat transferring resisting fluid which is *typically one or nitrogen, carbon dioxide, air or water.*" Thus, a supply of an inert gas or a supply of a cooling liquid are known mediums in the art for providing the same function of cooling the inlet pipes.

Regarding claims 2 and 48, Collin et al. discloses, by illustration, at least 85% of the inlet pipe 4 being surrounded by surround means 7 (see FIG. 1, 2).

Regarding claims 5 and 51, surround means 7 comprises one or more outer pipes surrounding a substantial portion of inlet pipe 4 (i.e., the nozzles comprise plural outer pipes as defined by jacket 7 and wall 17; FIG. 2).

Regarding claims 6 and 52, Collin et al. is silent as to the apparatus comprising differential expansion means for the inlet pipes 4 and surround means 7. As defined by the specification (page 4, lines 5-7) differential expansion means may include bends in the inlet pipe and/or pig-tails. In any event, it would have been obvious for one of ordinary skill in the art at the time the invention was made to provide means for allowing differential expansion of the inlet pipes and the surround means in the modified apparatus of Collin et al., on the basis of suitability for the intended use, because the Examiner takes Official Notice that the provision of bends and/or pig-tails in pipes for enabling differential expansion is well known in the art. Chowdhury (FIG. 4; column 4, lines 14-40) further evidences the conventionality of such a configuration by teaching an inlet pipe 20 and surround means 21 comprising differential expansion means (i.e., as shown in the figure, a 90-degree bend of the pipes).

Regarding claims 10, 11, 54 and 55, the reactor comprises means for suppressing ingress of reactants into the inlet pipes 4, wherein said means comprises providing the oxygen containing gas in the inlet pipe 4 at a pressure higher than the pressure in the reactor, using a

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compressor 45 (FIG. 3).

Regarding claims 19 and 63, Collin et al. illustrates the oxygen-containing gas being supplied to inlet pipe 4 via a common end box having inventory (i.e., a supply line 3 containing oxygen, comprising an annular conduit surrounding reactor 41; FIG. 1, 3; column 2, lines 58-64).

Regarding claims 20 and 64, Collin et al. discloses, "Preheated air was supplied through the nozzles 46 at a rate required for producing the heat of reduction and for maintaining, by partial combustion of the coal, a temperature of 970 °C in the reactor," (column 4, lines 56-59). However, Collin et al. is silent as to the nozzles being operably connected with "flow restriction means". In any event, such control elements would be inherent of the apparatus of Collin et al., as evidenced by the apparatus having the ability to vary and maintain a sufficient rate of air supply, and hence, a sufficient reaction temperature. Also, it would have been obvious for one of ordinary skill in the art at the time the invention was made to provide such flow restriction means to the nozzles in the modified apparatus of Collin et al. because the Examiner takes Official Notice that the provision of fluid control means, such as flow restrictions, for enabling the regulation of a feed rate to a reactor is well known in the art.

5. Claims 12-16 and 56-60 are rejected under 35 U.S.C. 103(a) as being unpatentable over Collin et al. (US 4,374,663) in view of Suess (US 2,794,681) and Chowdhury (US 4,461,743), as applied to claims 1 and 47 above, and further in view of Stephan et al. (US 3,411,716).

Regarding claims 12, 13, 56 and 57, Collin et al. is silent as to the inlet pipe 4 comprising ingress suppression means in the form of a restriction to the outlet of the inlet pipe. Stephan teaches a water-cooled oxygen injection nozzle (FIG. 1, 3; column 2, lines 41-69) comprising an inlet pipe 1 that is surrounded by a water-cooling jacket defined by concentric pipes 4 and 5.

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Additionally, the inlet pipe 1 comprises a restriction to the outlet of the inlet pipe 1 (i.e., plug 15 with control pipe 20; FIG. 3, 4), the restriction further defining an orifice (i.e., a venturi orifice defined by insert 23). It would have been obvious for one of ordinary skill in the art at the time the invention was made to provide a restriction to the outlet of the inlet pipe in the modified apparatus of Collin et al. because the oxygen distributing action of the nozzle is enhanced by the axial jet of oxygen projected centrally thereof from the orifice of the restriction, as taught by Stephan (column 3, lines 3-17).

Regarding claims 14-16 and 58-60, although the collective teaching of Collin et al. and Stephan et al. is silent as to the restriction being located at the specifically recited locations, it would have been obvious for one of ordinary skill in the art at the time the invention was made to select an appropriate location for the restriction in the modified apparatus of Collin et al., on the basis of suitability for the intended use, since shifting location of parts was held to have been obvious, and where the general conditions of a claim are disclosed in the prior art, discovering optimum or workable ranges involves only routine skill in the art.

6. Claims 18 and 62 are rejected under 35 U.S.C. 103(a) as being unpatentable over Collin et al. (US 4,374,663) in view of Suess (US 2,794,681) and Chowdhury (US 4,461,743), as applied to claims 1 and 47 above, and further in view of Wagner et al. (U.S. 5,801,265).

The collective teaching of Collin et al., Suess and Chowdhury is silent as to the distance between the inlet pipes being significantly in excess of the potential flame length. Wagner teaches a reactor 36 comprising oxygen gas inlets 60, wherein the inlets 60', 60'' are positioned such that the distance D between inlets 60', 60'' is significantly in excess of a potential flame length (FIG. 3; column 4, lines 15-38). It would have been obvious for one of ordinary skill in

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the art at the time the invention was made to configure the inlet pipes at a distance significantly in excess of the potential flame length in the modified apparatus of Collin et al., on the basis of suitability for the intended use, because such arrangement provides an improved system for introducing oxygen containing gas that avoids explosions, deflagration, or other anomalous process conditions, as taught by Wagner (column 2, lines 13-18).

7. Claims 1 and 47 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ellis et al. (US 3,351,634) in view of Suess (US 2,794,681) and Chowdhury (US 4,461,743).

Ellis et al. (FIG. 2A-2C; column 2, lines 54-66) discloses a reactor 10 comprising a grid 12 and more than one inlet pipes for supplying a molecular oxygen-containing gas (i.e., lines C for introduction of air, oxygen, or the like) extending into said reactor 10. Ellis et al. (column 2, lines 44-53, with emphasis added) further discloses that,

“In general, and for efficient operation, the above considerations presuppose the use of in-bed gas distribution systems such as grid-type distributors, multiple-nozzle distributors, and with external headers, single and multiple injection nozzles with and without headers, and in bed impinging jet streams. In order to maintain superheat gas injection temperatures and to minimize premature heat transfer to the fluid bed, *suitable insulating means are employed, including materials of construction, such as low heat transfer ceramic, jacketing, and the like.*”

Ellis et al., however, is silent as to whether such “suitable insulating means” may comprise the instantly claimed surround means and means for detecting a change in pressure of an inert gas surrounding the inlet pipes, wherein the surround means is provided with a limited supply of inert gas sufficient to replace minor leaks.

Suess (embodiment of FIG. 5; column 3, line 59 to column 4, line 32) teaches an inlet

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pipe (i.e., nozzle 3) suitable for feeding gaseous substances to a reactor (column 5, lines 4-14), wherein the inlet pipe 3 comprises a surround means (i.e., jacket 3') surrounding a substantial portion of the inlet pipe 3 and provided with a sealed supply of a cooling medium (i.e., from a cooling medium source 5, usually a liquid medium such as water; column 1, lines 38-55). In addition, Suess teaches means for detecting a change in pressure of the cooling medium 5 surrounding the inlet pipe 3 (i.e., by elements 10a, 10b, 10'' and 10''', which actuate according to a pressure difference, thereby initiating contact 11 to close the electric circuit and control a servomotor 9'''), wherein the surround means 3' is provided with a limited supply of cooling medium 5 sufficient to replace leaks (i.e., "by the contact 11 controlling servomotor 9''' the amount of the cooling medium is increased at the moment in which the amount discharged decreases because of a leakage... In this manner the detrimental effect of a leakage on the cooling procedure may be compensated to a certain extent," column 4, lines 21-33).

It would have been obvious for one of ordinary skill in the art at the time the invention was made to select the surround means and means for detecting a change in pressure as taught by Suess for the "suitable insulating means" in the reactor of Ellis et al., on the basis of suitability for the intended use and absent showing any unexpected results thereof, because the provision of such means would help avoid process disturbances due to leakage or similar defects occurring in the nozzles and parts or elements connected therewith, while simultaneously cooling the nozzles to prevent or reduce the harmful effects of high temperature on the nozzles, as taught by Suess (column 1, line 17 to column 2, line 33).

The collective teaching of Ellis et al. and Suess is silent as to whether the supply of cooling medium, such as water, may instead comprise a supply of inert gas. In any event, it

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would have been obvious for one of ordinary skill in the art at the time the invention was made to substitute a supply of inert gas for the supply of cooling medium in the modified apparatus of Ellis et al., on the basis of suitability for the intended use, because the use of inert gas for cooling nozzle structures is well known in the art, and the substitution of known equivalents merely involves routine skill in the art. Chowdhury (FIG. 4; column 4, lines 14-40) evidences conventionality by teaching an apparatus comprising an inlet pipe (i.e., oxygen pipe 20) including a surround means for surrounding a substantial portion of said pipe with a supply of sealed, inert fluid (i.e., second pipe 21, for defining a sealed, annular space 22 with an inlet 24 for a supply of inert fluid). In particular, Chowdhury teaches that suitable supplies of inert fluid include, "a gas such as air, nitrogen or carbon dioxide... injected into annular space 22," or, in another form, "a fluid, *either gas or liquid*, is passed through the annular space... Heat is thus removed from oxygen pipe 20 by the heat transferring resisting fluid which is *typically one or nitrogen, carbon dioxide, air or water*." Thus, a supply of an inert gas or a supply of a cooling liquid are known mediums in the art for providing the same function of cooling the inlet pipes.

Response to Arguments

8. Applicant's arguments with respect to claims 1, 2, 5, 6, 10-16, 18-20, 47, 48, 51, 52, 54-60 and 62-64 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion


Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jennifer A. Leung whose telephone number is (571) 272-1449. The examiner can normally be reached on 8:30 am - 5:30 pm M-F, every other Friday off.

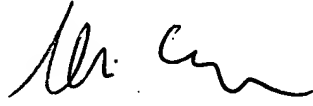
If attempts to reach the examiner by telephone are unsuccessful, the examiner's

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supervisor, Glenn A. Caldarola can be reached on (571) 272-1444. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Jennifer A. Leung
August 23, 2005 


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